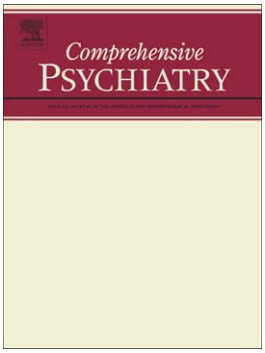
Negative symptoms are associated with lower autonomous motivation towards physical activity in people with schizophrenia

Vancampfort, Davy; De Hert, Marc; Stubbs, Brendon; Ward, Philip B.; Rosenbaum, Simon; Soundy, Andrew; Probst, Michel

DOI:
10.1016/j.comppsych.2014.10.007



Negative symptoms are associated with lower autonomous motivation towards physical activity in people with schizophrenia

Davy Vancampfort, Marc De Hert, Brendon Stubbs, Philip B. Ward, Simon Rosenbaum, Andrew Soundy, Michel Probst

PII: S0010-440X(14)00297-1
DOI: doi: 10.1016/j.comppsych.2014.10.007
Reference: YCOMP 51409

To appear in: *Comprehensive Psychiatry*

Received date: 7 July 2014
Revised date: 7 October 2014
Accepted date: 13 October 2014

Please cite this article as: Vancampfort Davy, De Hert Marc, Stubbs Brendon, Ward Philip B., Rosenbaum Simon, Soundy Andrew, Probst Michel, Negative symptoms are associated with lower autonomous motivation towards physical activity in people with schizophrenia, *Comprehensive Psychiatry* (2014), doi: 10.1016/j.comppsych.2014.10.007

COMPREHENSIVE PSYCHIATRY

Negative symptoms are associated with lower autonomous motivation towards physical activity in people with schizophrenia

Davy Vancampfort[a,b,*], Marc De Hert[a], Brendon Stubbs[c], Philip B. Ward[d,e], Simon Rosenbaum[f], Andrew Soundy[g], Michel Probst[a,b]

[a]KU Leuven Department of Rehabilitation Sciences, Leuven, Belgium

[b]KU Leuven Department of Neurosciences, UPC KU Leuven, campus Kortenberg, Kortenberg, Belgium

[c]School of Health and Social Care, University of Greenwich, Eltham, London, UK

[d]School of Psychiatry, University of New South Wales, Sydney, Australia

[e]Schizophrenia Research Unit, South Western Sydney Local Health District, Liverpool, Australia

[f]Musculoskeletal Division, The George Institute for Global Health and School of Public Health, University of Sydney, Sydney, Australia

[g]School of Sport, Exercise and Rehabilitation Sicences, University of Birmingham, Birmingham, B15 2TT, UK

*Corresponding author: Davy Vancampfort. University Psychiatric Centre KU Leuven, Campus Kortenberg, Leuvensesteenweg 517, 3070 Kortenberg, Belgium

Tel.: +32 2 758 05 11; Fax: +32 2 759 9879. E-mail address: davy.vancampfort@uc-kortenberg.be

Abstract

Objective: This cross-sectional study examined the association between psychiatric symptoms and motivation for physical activity within the self-determination theory (SDT) framework in people with schizophrenia.

Method: Over a 4-month period, 55 (17♀) inpatients with a DSM-V diagnosis of schizophrenia were assessed with the Psychosis Evaluation tool for Common use by Caregivers (PECC) and the Behavioural Regulation in Exercise Questionnaire (BREQ-2), that provided separate scores for amotivation, external, introjected and autonomous regulation. Spearman correlations coefficients were examined between these motivation scores and symptom ratings.

Results: The BREQ-2 score for autonomous regulations (2.6±1.1) was significantly correlated with the PECC negative symptoms score (10.3±4.1) (r=-0.34, p=0.011). No other significant correlations between BREQ-2 and PECC scores were found. The BREQ-2 score for external regulations (0.7±0.9) was associated with older age (35.2±11.3 years) (r=-0.30, p=0.024).

Conclusions: These findings provide evidence that negative symptoms are associated with lower autonomous motivation towards physical activity in inpatients with schizophrenia. Future longitudinal research should confirm the current findings. Such research will guide physical activity approaches aimed at facilitating enhanced physical and mental health outcomes in individuals with schizophrenia.

Keywords: schizophrenia; physical exercise; compliance

1. Introduction

Motivational deficits, which are understood under the broader umbrella of negative symptoms[1], are a core feature of schizophrenia and have important consequences for treatment response[2]. For example, previous research[3] demonstrated that negative symptoms cause people with schizophrenia to be disinterested in physical activity and exercise programmes. As a result, only a minority of people with schizophrenia engage in physical activity and exercise at a level compatible with health recommendations[4]. This is of concern, since physical activity can improve physical health outcomes and ameliorate some of the symptoms of schizophrenia[5]. Understanding the potential influence of negative symptoms on motivation towards physical activity will enable effective health promotion in clinical settings for persons with schizophrenia. Most research in this field[6,7] has assessed only amotivation or lack of motivation. However, motivation is more complex and researchers have recently begun toconsider it'smultidimensional nature in persons with schizophrenia[8,9]. A prominent theory describing what drives goal pursuit and specific behaviours, and that might assist research on motivation for physical activity and exercise in people with schizophrenia[10], is the self-determination theory (SDT)[11-13]. Broadly, this multidimensional theory proposes that motivation resides along a continuum of increasing self-determination. The lowest end of the continuum is identified as amotivation which represents a general lack of motivation to change behaviour. Following along the continuum, external regulation refers to exercising to avoid punishment or criticism or to obtain promised rewards or external appreciation. Introjected regulation refers to internally-derived motivation, linked to feelings of guilt, or self-criticism, as a function of non-participation and contingent self-worth as a function of participation in exercise. More volitional or autonomous forms of motivation include identified regulation, which involves assigning some personal value to physical activity, and integrated regulation, which is the most autonomous form of extrinsic motivation, such that

physical activity and exercise are equally valued with other life values, such that being active becomes prioritised within an individual's lifestyle. Finally, intrinsic motivation involves engaging in physical activity or exercise for its own sake, that is, because one finds being active enjoyable. SDT highlights the importance of both quantity and type of motivation. More specifically, physical activity can be regulated by autonomous or volition (i.e. identified and intrinsic regulations) relative to more controlled or pressured reasons (i.e. external and introjected regulations). Recent research[14] indicated that people with schizophrenia who are more autonomously regulated towards physical activity are more likely to voluntarily exercise over longer periods of time and are therefore more likely to benefit from the multitude of health benefits conferred by an active lifestyle.

To date, the limited number of studies[9,10,15,16] that have investigated the associations between negative symptoms and motivation have not found significant correlations. A possible reason might be that these studies assessed a more general state of motivation[9,15,16] or overall life goals[10] instead of assessing specific behaviours or regulations. A state of general motivation (e.g. towards cognitive learning)[9] may not be related to more activity-specific motivations. For research and clinical purposes, motivational regulations should be assessed as task- or activity-specific since they vary widely.

The primary aim of the current study was to examine associations between negative symptoms and motivations for being physically active as defined within the SDT-framework. A secondary aim was to investigate whether other symptom clusters were associated with the quantity and quality of motivations towards physical activity.

2. Material and methods

2.1. Participants

Over a 4-month period, all consecutive inpatients admitted to the UPC KU Leuven in Belgium with a DSM-V diagnosis of schizophrenia[1] and who were psychiatrically stable on psychotropic medication for at least 4 weeks were invited to participate. Diagnosis was determined by treating psychiatrists. Only patients with a clinical global impression severity scale[17] score of three or less, as assessed by a trained psychiatrist during a semi-structured interview, and who were able to concentrate for at least half an hour were included. No incentive was provided for participation. The study procedure was approved by the Scientific and Ethical Committee of the UPC KU Leuven, campus Kortenberg, Belgium in accordance with the principles of the Declaration of Helsinki. All participants provided informed written consent.

2.2. Psychosis Evaluation tool for Common use by Caregivers (PECC)

The PECC was used to assess schizophrenia symptoms[18]. The assessment was made prior to completing the questionnaires by an independent mental health nurse. The assessor was provided with training on how to administer the PECC. The semi-structured PECC-interview evaluates 20 symptom items on a 7-point scale. Symptoms are grouped in 5 factors: negative, positive, depressive, cognitive and excitatory symptoms. The scores for each factor range from 4 to 28. Validation results[19] demonstrate that the PECC can be used for the evaluation of these symptoms in schizophrenia.

2.3. Behavioural Regulation in Exercise Questionnaire (BREQ-2)

The Dutch version of the BREQ-2[20] was used as an interviewer-administered questionnaire in order to ensure that patients with any literacy problems were not excluded. The interviewer

was an independent research assistant blinded to the PECC data. The BREQ-2 considers an individual's motivation towards exercise. We adapted the BREQ-2 by replacing the term "exercise" with the term "physical activity". This was undertaken for two reasons, firstly, physical activity recommendations refer to all physical activities and not to exercise in particular which is only one part of the physical activity behaviour[21]. Secondly, a similar change was made and successfully applied in prior research[22]. The questionnaire comprised 19 items relating to five motivation types from the SDT. In accordance with previous research[23] in people with schizophrenia "identified regulation" and "intrinsic regulation" were combined to a single factor labelled "autonomous regulation". Each item is measured on a five-point Likert-scale, from 0 ('Not true for me') to 4 ('Very true to me'). The mean of every subscale (amotivation, external regulations, introjected regulations, autonomous regulations) was calculated toprovide an objective measurefor each motivation type separately. The interviewer-administered BREQ-2 has been validated before in people with schizophrenia[23]. More in detail, the exploratory factor analysis in people with schizophrenia showed sufficient convergence with the factors structure of the non- interviewer-administered original BREQ-2.

2.4. Anthropometric assessments

Body weight was measured in light clothing to the nearest 0.1 kg using a SECA beam balance scale, and height to the nearest 0.1 cm using a wall-mounted stadiometer.

2.5. Medication use

Current antipsychotic medication use was recorded for each patient and converted into a daily equivalent dosage of chlorpromazine following the recommendations of Gardner and colleagues[24].

2.6. Statistical analysis

Spearman correlation tests were used to determine relationships between symptom ratings and different motivational factors. We used the following correlation classification according to Surwillo[25]: 0–39 = low; 40–69 = moderate to substantial; 70–100 = high to very high. A priori, statistical significance was set at $P<0.05$. Statistical analyses were performed using the statistical package SPSS version 22.0 (SPSS Inc., Chicago, IL).

3. Results

3.1. Participants

Of 61 patients with schizophrenia who were invited to participate, 59 met the inclusion criteria of which 4 declined to participate. Reasons for exclusion and drop-out are presented in Figure 1. The gender distribution of the final included sample was 38 men (34.7±11.9years; BMI=25.4±3.1) and 17 women (36.1±10.4years; BMI=27.4±5.7). Age ranged from 20 to 62 years. All participants were Caucasians.

[Insert Figure 1 about here]

A summary of the means and standard deviations for all demographic data and the PECC and BREQ-2 scores is presented in Table 1.

[Insert Table 1 about here]

3.2. Associations of the PECC scores with BREQ-2 scores and demographical variables

A summary of the Spearman correlations of the PECC with BREQ-2 scores is presented in Table 2. The BREQ-2 score for autonomous regulations demonstrated a small but significant correlation with the PECC negative symptoms score (r=-0.34, p=0.01). Greater autonomous motivation was linked to lower levels of negative symptoms. No other significant correlations between BREQ-2 and PECC scores were found.

[Insert Table 2 about here]

When looking at the correlations of the BREQ-2 subscale scores with demographic variables, only external motivation demonstrated a small but significant correlation with older age (r=-0.30, p=0.02).There were no significant correlations with BMI or antipsychotic medication dose (data available on request).

4. Discussion

4.1. General findings

This is the first study to explore associations between psychiatric symptoms and multi-dimensional motivation for physical activity in people with schizophrenia. We found that negative symptoms were significantly associated with lower levels of autonomous motivation towards physical activity. Negative symptoms were not associated with levels of amotivation. There were no other significant associations between psychiatric symptoms and other subtypes of motivation for physical activity. Previous studies that examined relationships between motivation and psychiatric symptoms in people with schizophrenia[9,15,16,26] reported mixed findings. The current study provides new evidence that motivation towards physical activity appears to be unrelated to concurrent positive, cognitive, excitatory and depressive symptoms, suggesting that people with schizophrenia can become motivated to engage in physical activity regardless of their level of cognitive functioning or the presence of these symptoms.

However, clinicians and researchers should take into account negative symptoms when trying to motivate people with schizophrenia towards an active lifestyle. Rather than focusing on increasing the quantity of motivation, our data indicate that clinicians should focus on improving the autonomous motivation towards physical activity and exercise in patients experiencing negative symptoms.According to SDT, the transition from controlled to autonomous motivation can be facilitated in environments that support three psychological constructs, that is the need for autonomy (i.e., experiencing a sense of psychological freedom when engaging in physical activity), competence (i.e., ability to attain desired outcomes) and relatedness (i.e., being socially connected)[11-13]. Clinicians can support clients' autonomy by offering clear choices, supporting the clients' initiatives, avoiding the use of external rewards, offering relevant information for changing physical activity behaviour and using autonomy

supportive language (e.g. "could" and "choose" rather than "should" and "have to")[11-13]. Feelings of competence can be enhanced when people with schizophrenia experience success while participating in physical activity or exercise sessions. Physical activity should be tailored to the capabilities of an individual and sufficient detailed instructions, practice and positive feedback provided. Physiotherapists are ideally placed to facilitate this process[27]. Also relationships with the health care provider and with peers are important when motivating people with schizophrenia experiencing high levels of negative symptoms. Health care providers need to show enthusiasm and interest in their clients. Offering group sessions of physical activity could increase feelings of relatedness and decrease feelings of isolation.

4.2. Limitations and future research

Firstly, the sample size was modest and our findings should be interpreted with caution and be considered as exploratory. Replication is necessary in larger samples in order to confirm our results. Secondly, caution should also be exercised in interpreting our findings given the cross-sectional nature of this research. It is not possible to ascertain whether persons with schizophrenia experiencing high levels of negative symptoms developed less autonomous motivation towards physical activity over time or whether other factors (e.g., environmental, socio-economic and/or social factors) contributed. Longitudinal and intervention studies of negative symptomatology and motivation towards an active lifestyle could help to identify the causal pathways between these constructs. Thirdly, participants were hospitalised at the time of the study. Previous research[28] demonstrated that environmental variables are significantly associated with physical activity behaviour and with motivation towards physical activity. More in detail, it has been demonstrated previously[28] that inpatients experience significantly less external and introjected motivation than outpatients. A reason might be that outpatients experience more pressure from their family and friends to be physically active while feeling guilty or ashamed when they do not comply with these demands. More research is however

needed to explore whether also in outpatients the level of negative symptoms might explain differences in motivation towards physical activity. Lastly, although we tried to provide a trustful environment for the BREQ-2 interview and participants were informed that data were analysed anonymously, a bias in the sense of social desirability cannot be ruled out. Despite the current limitations, the present results provide preliminary data regarding motivation towards physical activity in people with schizophrenia and its relationship with psychiatric symptomatology.

In conclusion, the current study is the first to establish that negative symptoms were associated with lower autonomous motivation to engage in physical activity in inpatients with schizophrenia. Future longitudinal research should confirm the current findings. Such research will guide physical activity approaches aimed at facilitating enhanced physical and mental health outcomes in individuals with schizophrenia.

References

1. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 5th ed. Washington: American Psychiatric Association; 2013.
2. Strauss GP, Waltz JA, Gold JM. A review of reward processing and motivational impairment in schizophrenia. *Schizophr Bull* 2014;**40**:107-16.
3. Vancampfort D, Knapen J, Probst M, Scheewe T, Remans S, De Hert M. A systematic review of correlates of physical activity in patients with schizophrenia. *Acta Psychiatr Scand* 2012;**125**: 352-62.
4. Vancampfort D, De Hert M, Skjaerven LH, Gyllensten AL, Parker A, Mulders N, et al. International Organization of Physical Therapy in Mental Health consensus on physical activity within multidisciplinary rehabilitation programmes for minimising cardio-metabolic risk in patients with schizophrenia. *Disabil Rehabil* 2012;**3**:1-12.
5. Rosenbaum S, Tiedemann A, Sherrington C, Curtis J, Ward PB. Physical activity interventions for people with mental illness: a systematic review and meta-analysis. J Clin Psychiatry 2014; doi: 10.4088/JCP.13r08765.
6. Medalia A, Brekke J. In search of a theoretical structure for understanding motivation in schizophrenia. *Schizophr Bull* 2010; **36**:912-8.
7. Wolf DH, Satterhwaite TD, Kantrowitz JJ, Katchmar N, Vandekar L, Elliott MA, et al. Amotivation in schizophrenia: integrated assessment with behavioral, clinical, and imaging measures. *Schizophr Bull* 2014; doi:10.1093/schbul/sbu026.

8. Medalia A, Saperstein A. The role of motivation for treatment success. *Schizophr Bull* 2011;**37**:122-8.
9. Choi J, Choi KH, Felice Reddy L, Fiszon JM. Measuringmotivation in schizophrenia: is a generalstate of motivationnecessary for task-specificmotivation? *Schizophr Res* 2014;**153**:209-13.
10. Gard DE, Sanchez AH, Starr J, Cooper S, Fisher M, Rowlands A, et al. Using self-determination theory to understand motivation deficits in schizophrenia: the 'why' of motivated behavior. *Schizophr Res* 2014;**156**:217-22.
11. Deci EL, Ryan RM. *Intrinsic motivation and self-determination in human behaviour*. New York: Plenum Press; 1985.
12. Deci EL, Ryan RM. The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychol Inquiry* 2000;**11**: 227-68.
13. Vansteenkiste M, Niemiec C, Soenens B. The development of the five mini-theories of self-determination theory: An historical overview, emerging trends, and future directions. In: Urdan T, Karabenick S, editors. *Advances in Motivation and Achievement, vol. 16: The decade ahead.* UK: Emerald Publishing; 2010, p. 105-166.
14. Vancampfort D, De Hert M, Vansteenkiste M, De Herdt A, Soundy A, Stubbs A, Buys R, Probst M. Self-determination and stage of readiness to change physical activity behaviour in schizophrenia. *Ment Health Phys Activity* 2014; doi:10.1016/j.mhpa.2014.06.003.
15. Barch D, Yodkovik N, Sypher-Locke H, Hanewinkel M. Intrinsic motivation in schizophrenia: relationships to cognitive function, depression, anxiety, and personality. *J Abnorm Psychol* 2008;**117**:776-87.
16. Choi J, Mogami T, Medalia A. Intrinsic Motivation Inventory (IMI): an adapted scale for schizophrenia research. *Schizophr Bull* 2010;**36**: 957-65.

17. Guy W. *Clinical Global Impressions Scale. ECDEU assessment manual for pharmacology*. Rockville: US Department of Health, Education, and Welfare; 1976.
18. De Hert M, Bussel J, Lindstöm E, Abrahams F, Fransens C, Peuskens J. *PECC, Psychosis Evaluation tool for Common use by Caregivers*. Antwerpen: EPO; 1998.
19. De Hert M, Wampers M, Thys E, Wieselgren I, Lindstöm E, Peuskens J. Validation study of PECC (Psychosis Evaluation tool for Common use by Caregivers): Interscale validity and inter-rater reliability. *Int J Psychiatry Clin Pract* 2002;**6**:135-40.
20. Markland D, Tobin V. A modification to the behavioural regulation in exercise questionnaire to include an assessment of amotivation. *J Sport Exerc Psychol* 2004;**26**:191-6.
21. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise and physical fitness: definitions and distinctions for health-related research. *Public Health Reports* 1985;**100**:126-31.
22. Verloigne M, De Boudeauhuiji E, Tanghe A, D'Hondt E, Theuwis L, Vansteenkiste, et al. Self-determined motivation towards physical activity in adolescents treated for obesity: an observational study. *Int J Behav Nutr Phys Act* 2011;**8**: 97.
23. Vancampfort D, De Hert M, Vansteenkiste M, De Herdt A, Scheewe TW, Soundy A, et al. Self-determined motivation towards physical activity in schizophrenia: a multicentre study. *Psychiatry Res* 2013;**210**: 812-8.
24. Gardner DM, Murphy AL, O'Donnell H, Centorrino F, Balderssarani RJ. International consensus study of antipsychotic dosing. *Am J Psychiatry* 2010;**167**:686-93.
25. Surwillo W. *Experimental design in psychiatry. Research methods for clinical practice*. New York: Grune and Stratton; 1980.

26. Nakagami E, Xie B, Hoe M, Brekke J. Intrinsic motivation, neurocognition andpsychosocial functioning in schizophrenia: testing mediator and moderator effects. *Schizophr Res* 2008;**105**: 95-104.

27. Stubbs B, Probst M, Soundy A, Parker A, De Herdt A, De Hert M, et al. Physiotherapists can help implement physical activity programmes in clinical practice. *Br J Psychiatry* 2014;**204**:164.

28. Vancampfort D, De Hert M, De Herdt A, Vanden Bosch K, Soundy A, Bernard P, et al. Associations between physical activity and the built environment in patients with schizophrenia: a pilot study. *Gen Hosp Psychiatr* 2013;**35**:653-8.

Figure 1. Flowchart of the eligible participants

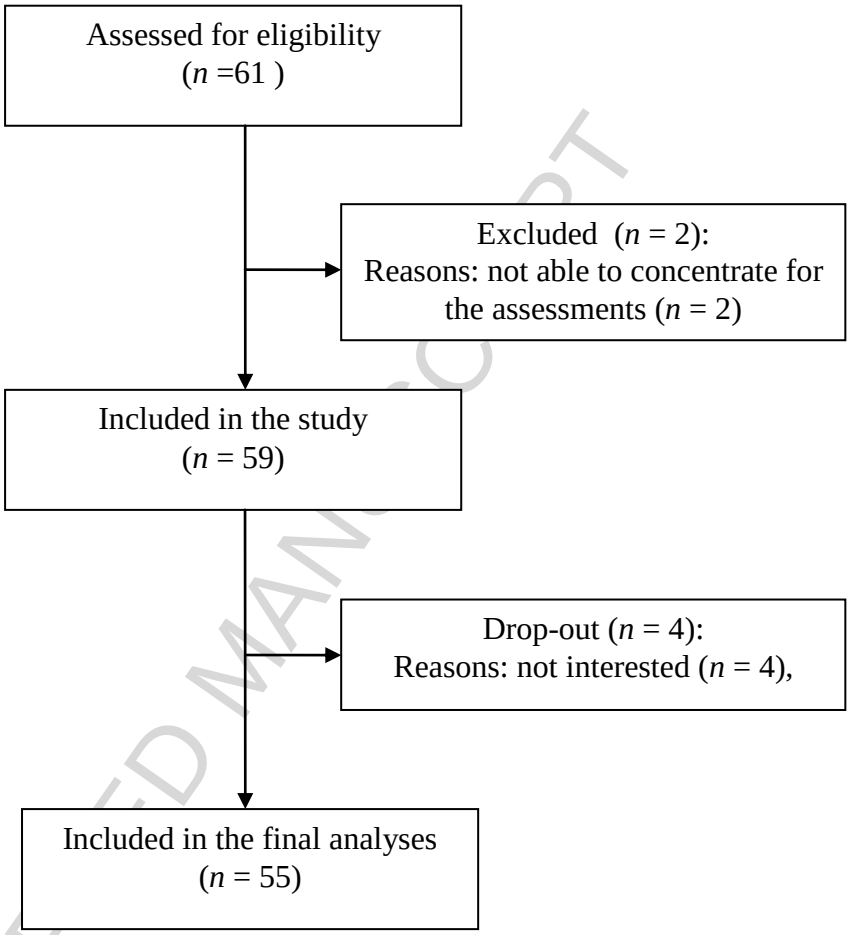


Table 1. Overview of the demographical variables, PECC and BREQ-2 scores (n=55)

Variable	**Mean±standard deviation**
Age (years)	35.2±11.3
Body mass index (kg/m²)	26.0±4.1
Chlorpromazine equivalent (mg)	659.7±403.8
PECC negative symptoms	10.3±4.1
PECC positive symptoms	9.2±4.2
PECC depressive symptoms	9.4±4.2
PECC excitatory symptoms	7.8±3.7
PECC cognitive symptoms	7.8±4.8
BREQ-2 amotivation	0.5±0.7
BREQ-2 external regulations	0.7±0.9
BREQ-2 introjected regulations	0.9±0.9
BREQ-2 autonomous regulations	2.6±1.1

PECC=Psychosis Evaluation tool for Common use by Caregivers, BREQ-2=Behavioral Regulation in Exercise Questionnaire.

Table 2. Spearman correlation values for associations between PECC and BREQ-2 scores (n=55)

Variables	**PECC negative**	**PECC positive**	**PECC depression**	**PECC excitatory**	**PECC cognitive**
BREQ-2 amotivation	0.25	0.03	-0.13	0.02	0.08
BREQ-2 external regulations	0.04	0.07	-0.13	-0.05	-0.001
BREQ-2 introjected regulations	0.02	0.004	-0.015	0.07	0.08
BREQ-2 autonomous regulations	-0.34*	-0.11	0.09	0.08	-0.19

*Significant when $p<0.05$; PECC=Psychosis Evaluation tool for Common use by Caregivers, BREQ-2=Behavioral Regulation in Exercise Questionnaire.